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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,911	KNEE ET AL.	
	Examiner	Art Unit	
	EUENG-NAN YEH	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _28 July 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-33_ is/are pending in the application.

4a) Of the above claim(s) _13-20,22,23 and 33_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-12,21 and 24-32_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _July 28, 2008_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

FINAL ACTION

Response to Amendment

1. The following Office Action is responsive to the amendment and remarks received on July 28, 2008. Original claims 13-20, 22-23, and 33 were canceled. Claims 1-12, 21, and 24-32 remain pending.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings **must show every feature of the invention specified in the claims**. For example, claim 1 recites the membership determination and this method has not been shown in any figure. Therefore, the claimed subject matter: all the features included in "**method** of segmenting image data having a plurality of feature values at each pixel in a sequence of pictures, the feature values including pixel values and motion vector values" must be shown or the features canceled from the claims. No new matter should be entered.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. **The objection to the drawings will not be held in abeyance**.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4, 6-8, 12, 24-27, and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Castagno et al. (IEEE Vol. 8, No. 5, Sep. 1998, 562-571), Park et al. (US 6,535,632 B1), and Bierling et al. (US 4,771,331).

Regarding claims 1, Castagno discloses a segmentation system comprising: representing the data as points in a segmentation vector space which is the product of the vector space of feature values and the vector space of pixel addresses (as depicted in figure 2, “Fig. 2 shows a segmentation at the region level. For the sake of simplicity,

we have selected a case in which the coherence within each region is based on gray level and color" at page 564, right column, line 1. See also "We have tested approximately 20 different features, chosen among color components (such as RGB, YUV, LSH, normalized RGB, and others), displacement values (the horizontal and vertical components of the optical flow), position values (the absolute x and y coordinates), and texture information …" at page 565, left column, bottom paragraph);

representing segments as locations in the segmentation vector space (as depicted in figures 3-5: "Figs. 3–5 show three examples of how the same segmentation at the region level can yield different segmentations at the object level" at page 564, right column, line 4. See also "We have tested approximately 20 different features, chosen among color components (such as RGB, YUV, LSH, normalized RGB, and others), displacement values (the horizontal and vertical components of the optical flow), position values (the absolute x and y coordinates), and texture information …" at page 565, left column, bottom paragraph);

determining a segment for each pixel by the distance in segmentation vector space from the data point representing the pixel to the location of the segment ("The features that we propose to use in our segmentation scheme belong to four groups (color, motion, position, and texture). Each one is characterized by quite different ranges of possible values … In order to process this information in parallel, it is therefore necessary to introduce some form of normalization that allows us to define a distance which is easily measurable. A common solution is known as Mahalanobis distance … The use of the

Mahalanobis distance therefore induces a distance between two vectors f_m and f_n in the feature vector space …" at page 565, right column, bottom paragraph).

Castagno does not explicitly disclose that this distance can be used as membership measurement in the segmentation vector space. Furthermore, Castagno suggests motion and position as features of segmentation. Castagno does not explicitly disclose displaced frame difference, DFD, in segmentation vector space and how to calculate DFD.

Park, in the same field of endeavor of color image processing ("object tracking and image segmentation" at column 1, line 27), teaches the cluster segmentation determination as depicted in figure 10: "process for allocating input vectors into clusters is performed for each input vector (step 84). Such process is based upon a minimum distance measure. In various embodiments an euclidean distance, an absolute distance or some other distance measure is used. In one embodiment the euclidean distance is used. An input vector is allocated to a cluster to which it has a minimal euclidean distance with the cluster's prototype vector. At step 86, the prototype vector closest to the input vector is found. As a self-organizing control for allocating data into clusters, a vigilance parameter, also referred to herein as a vigilance value, is used. A vigilance test is performed at step 88. If the minimum euclidean distance is not less than the vigilance value, then a new cluster is defined at step 90. The input vector is assigned to such new cluster and becomes the initial prototype vector for such new cluster. If the minimum euclidean distance is less than the vigilance value, then the input vector is

assigned to the cluster corresponding to the closest prototype vector at step 92 …" at column 10, line 37. Thus, the distance determines the membership of input vector.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to be motivated to include the segmentation system Castagno made with membership determination algorithm as taught by Park, in order to properly classify each segment such that "an input vector is allocated to a preexisting cluster or a new cluster" at column 10, line 55.

The combination of Castagno and Park does not explicitly disclose how to calculate displaced frame difference, DFD, and DFD is one of the feature values.

Bierling, in the field of endeavor of reconstruction of television sequences ("to provide an improved method of motion compensating field interpolation" at column 2, line 1), discloses a technique "provides uniquely defined displacement vector fields which are valid for the temporal positions of the fields to be interpolated, rather than for the transmitted fields. This further reduces the jerkiness in the motion compensating interpolated sequence" at column 3, line 25. Wherein, "Each displacement vector is determined in such a way that it connects two picture elements of two available fields and crosses the spatial position of the picture element to be interpolated" at column 5, line 32. The detailed displacement estimator is discussed at column 5, line 44. Mainly, as shown in figure 2 "… a moving object caused a frame difference signal FD, where $FD(x,y) = S_k(x,y) - S_{k-1}(x,y)$. Compensating the displacement by an estimated displacement vector D^ with the components dx^, dy^, the remaining frame difference, called displaced frame difference (DFD), results as $DFD(x,y,D\hat{}) = S_k(x+dx\hat{},y+dy\hat{}) - S_{k-1}$

(x,y). Under the above mentioned assumptions, the DFD approaches zero if the estimate D^ is close to the true displacement vector D …" at column 5, line 57.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to be motivated to include the segmentation system of the Castagno and Park combination with displaced frame difference (DFD) as one of the feature values as taught by Bierling, in order to "further reduces the jerkiness in the motion compensating interpolated sequence" at column 3, line 28.

Regarding claim 2, the segments are represented as points (as depicted in Castagno figure 2, "Fig. 2 shows a segmentation at the region level …" at page 564, right column, line 1. The segments are represented as points).

Regarding claim 3, the segments are represented as linear functions mapping the vector space of pixel locations to the vector space of pixel values (as depicted in Castagno figure 2, segmented pixel point position (x, y) maps and one-to-one corresponds to the gray level value of the image. "Fig. 2 shows a segmentation at the region level … each region is based on gray level and color" at page 564, right column, line 1).

Regarding claim 4, the distance measure is a Euclidean distance (discussed in claim 1, "…Such process is based upon a minimum distance measure. In various embodiments an euclidean distance, an absolute distance or some other distance

measure is used. In one embodiment the euclidean distance is used. …" at Park column 10, line 38).

Regarding claim 6, the coordinate axes are scaled to equalize the variances of the data along each axis ("The features that we propose to use in our segmentation scheme belong to four groups (color, motion, position, and texture). Each one is characterized by quite different ranges of possible values: color information typically ranges from 0 to 255, motion spans a more limited interval (for example, pixels/frame), the x and y coordinates are limited by the size of the image, while the texture information shows the biggest variations. In order to process this information in parallel, it is therefore necessary to introduce some form of normalization that allows us to define a distance which is easily measurable" at Castagno page 565, right column, bottom paragraph. The variance is used in equation 3 at page 565).

Regarding claim 7, the coordinate axes are scaled in order to minimize the product of errors evaluated along each axis, with the constraint that the scaling factors sum to a constant value ("In the experiments, we gave a weight of 10% to the position information (x and y coordinates), and 5% to the texture information. The motion and the color information adaptively share the remaining 85% according to their reliability, with the qualitative behavior shown in Fig. 8" at Castagno page 568, right column, line 3. Thus, the total weighting sum is 100% and "allocates relative weight to features according to their local degree of reliability" at page 566, left column, line 25. The

reliability i.e. minimize the product of errors is discussed at page 567, in Section III-E3 “Confidence Measure Derived from the Optical Flow Estimation Method”).

Regarding claim 8, the distance measure is a Mahalanobis distance (discussed in claim 1, “…A common solution is known as Mahalanobis distance …” at Castagno page 565, right column, line 41).

Regarding claims 12, for each picture of initially assigning pixels to segments according to the segment membership of the respective pixel in the preceding picture in the sequence (“…The segmentation results obtained for the current frame are eventually used as initialization for the FCM procedure at frame n+1 …” at Castagno page 568, right column, line 42. Thus, the initially assigning pixels to segments is taken from the preceding picture).

Regarding claim 24, each pixel is chosen to be a member of a single segment determined by minimizing the distance measure (“… An input vector is allocated to a cluster to which it has a minimal euclidean distance with the cluster's prototype vector …” at Park column 10, line 42.

Regarding claim 25, the number of segments is chosen by the user (“We define a region as an area of the frame which homogeneous according to given quantitative criteria, such as gray level, color, texture, motion, or—in the most general case—a

combination of them" at Castagno page 564, left column, line 1. Thus, the user defines regions of the frame).

Regarding claim 26, the number of segments is chosen as a function of the input data ("Our definition of object is in full accordance with the concept of video object as defined in the framework of MPEG-4, 'an entity in a scene that a user is allowed to access (seek, browse), and manipulate (cut and paste)' … objects are strongly characterized by their semantic content …" at Castagno page 564, left column, line 7. See also "In one implementation for a sequence of image frames, such filtering allows for improved image object tracking ability and improved image object segmentation" at Park column 2, line 46. Thus, the quality and characteristic of data can affect the number of segments).

Regarding claim 27, the number of segments is chosen so that the variance of an overall error measure approaches a predetermined value ("…introduction of a spatial constraint that biases the algorithm so as to encourage adjacent pixels to be assigned to the same class. The proposed modification, called constrained fuzzy C-means (CFCM) … In our approach, the standard FCM algorithm is used to obtain an initial segmentation, and the spatial constraint is introduced in a second round of iterations aimed at refining the result" at Castagno page 568, right column, line 22).

Regarding claim 29, the representations of segments in the vector space are updated according to the segment membership of pixels ("As is the case for the FCM algorithm, the fuzzy partition of the data set can be obtained by iteratively updating the centroids and the degree of belongingness of each vector to the classes" at Castagno page 568, right column, line 32. This is to say that the fuzzy partition of the data set which represents the segment in the vector space is updated according to the degree of belongingness of each vector to the classes).

Regarding claim 30, the processes of assigning pixels to segments and of updating the representations of segments are repeated alternately ("As is the case for the FCM algorithm, the fuzzy partition of the data set can be obtained by iteratively updating the centroids and the degree of belongingness of each vector to the classes" at Castagno page 568, right column, line 32. This is to say that the degree of belongingness of each vector which assigns pixels to segments and the centroids of the fuzzy partition of the data set which represents the segment are iteratively updated).

Regarding claim 31, the initial segmentation is taken from the previous picture in a sequence of pictures ("…The segmentation results obtained for the current frame are eventually used as initialization for the FCM procedure at frame n+1 …" at Castagno page 568, right column, line 42. Thus, the initial segmentation is taken from the previous picture).

Regarding claim 32, the displaced frame differences are calculated by applying motion vectors derived from the current state of the segmentation to the input pixel data ("Each displacement vector is determined in such a way that it connects two picture elements of two available fields and crosses the spatial position of the picture element to be interpolated" at Bierling column 5, line 32. Furthermore, the formula represents the displaced frame differences (DFD) is listed as equation 3 at Bierling column 5).

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Castagno, Park, and Bierling as applied to claim 1 discussed above, and further in view of Aggarwal et al. (US 6,728,706 B2).

Regarding claim 5, the Castagno, Park, and Bierling combination teaches that the distance used can be Euclidean or Mahalanobis. The Castagno, Park, and Bierling combination does not explicitly teach the Manhattan distance.

Aggarwal, in the file of endeavor of image similarity search ("Similarity searches are performed on the basis of similarity functions" at column 4, line 24), teaches distance metrics, such as Manhattan distance, used to determine the similarity during search phase: "In this feature space, each product is represented by a feature vector corresponding to the feature values extracted for it in step 240 *(figure 2)*" at column 7, line 8. Furthermore, "feature values in the database will have different ranges, for example, (maximum value over the entire database--minimum value over the entire database). Consequently, features with a larger range dominate over a feature with smaller range when, for example, Manhattan, Euclidean, or Mahalanobis distance

metrics are used for determining the similarity between two products during the search phase" at column 7, line 46.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to be motivated to include the segmentation system of the Castagno, Park, and Bierling combination with Manhattan distance metric as taught by Aggarwal, not only for its mathematical simplicity and calculatingly fast but also to ensure that "none of the features are given undue importance when calculating similarity metrics" at column 7, line 59.

7. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Castagno, Park, and Bierling as applied to claim 1 discussed above, and further in view of Price et al. (US 5,606,164).

Regarding claim 9, the Castagno, Park, and Bierling combination teaches:
representing the data as points in a segmentation vector space which is the product of the vector space of feature values and the vector space of pixel addresses (discussed in claim 1, for representing the data as points in a segmentation vector space);
representing the data as points in a segmentation vector space (discussed in claim1, for representing segments as locations in the segmentation vector space);
determining the membership of a segment for each pixel through said distance measure (discussed in claim 1, for determining the membership of a segment).

The Castagno, Park, and Bierling combination does not explicitly disclose the usage of covariance matrix.

Price, in the field of endeavor of data analysis ("measuring biological fluid analyze concentration using outlier identification and removal based on generalized distances" at column 3, line 12), discloses the usage of principal component analysis on the generalized distances: "… the calibration data set may be reduced to significant factors using principal component analysis or partial least squares scores, enabling calculation of regression coefficients and artificial neural network weights" at column 3, line 38. And "… generalized distance between a sample and the centroid defined by a set of samples may be determined using the variance-covariance matrix of the set of samples … Further, by using principal component scores to represent spectral data for each sample, independent variables maximizing the information content may be obtained, insuring an invertible approximate variance-covariance matrix. With respect to Mahalanobis distance, an approximate centroid may be determined as the centroid of a multivariate normal distribution of the set of calibration samples and an approximate variance-covariance matrix of the set of calibration samples, whereby an approximate Mahalanobis distances in units of standard deviations measured between the centroid and each calibration sample may be found …" at column 5, line 17.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to be motivated to include the segmentation system of the Castagno, Park, and Bierling combination with covariance matrix application as taught by Price, such that by "using principal component scores to represent spectral data for each sample, independent variables maximizing the information content may be obtained, insuring an invertible approximate variance-covariance matrix" at column 5, line 25.

Regarding claim 10, covariance matrix (discussed at Price column 11, equation (7), where S is the covariance matrix).

Regarding claim 11, distance measurement (discussed at Price column 11, equation (6) for the Mahalanobis distances).

8. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Castagno, Park, and Bierling as applied to claims 1, 25, 26, and 27 discussed above, and further in view of Penn (US 5,848,198).

Regarding claim 28, the combination of Castagno, Park, and Bierling teaches segmentation processing with chosen number of segments as discussed in claims 25, 26 and 27. The Castagno and Park combination does not explicitly teach that the process can be in parallel.

Penn, in the field of endeavor of processing digitized images ("for detecting, identifying, and analyzing anomalies and abnormalities within the images" at column 1, line 12), provides "a new and improved method of and apparatus for achieving significant reduction in image data processing time by using a methodology which is amenable to parallel processing …" at column 16, line 27. The processing involves such as "…(iii) a coded method of segmenting the Analysis Image according to the locations of the fractal-like forms. (iv) a coded procedure for obtaining a set of binary images for each segment …" at column 7, line 61. Furthermore, "determine a relative

merit of the performance measure, a ‘best measure’ is initialized either high or low as per the specification and stored in computer memory 32 *(figure 1)* …” at column 26, line 39.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to be motivated to include the segmentation system of the Castagno, Park, and Bierling combination with parallel processing methodology as taught by Penn, for “achieving significant reduction in image data processing time” at column 16, line 18.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Castagno, Park, and Bierling as applied to claim 1 discussed above, and further in view of Globus et al. (US 4,078,860).

Regarding claim 21, the Castagno, Park, and Bierling combination teaches: representing the image data as points in a segmentation vector space which is the product of the vector space of feature values and the vector, space of pixel addresses (as depicted in Castagno figure 2, “Fig. 2 shows a segmentation at the region level. For the sake of simplicity, we have selected a case in which the coherence within each region is based on gray level and color” at Castagno page 564, right column, line 1. See also “We have tested approximately 20 different features, chosen among color components (such as RGB, YUV, LSH, normalized RGB, and others), displacement values (the horizontal and vertical components of the optical flow), position values (the absolute x and y coordinates), and texture information …” at Castagno page 565, left column, bottom paragraph);

initially assigning pixels to segments represented as locations in the segmentation vector space (as depicted in Castagno figures 2-5: “Fig. 2 show a segmentation at the region level. For the sake of simplicity, we have selected a case in which the coherence within each region is based on gray level and color” at Castagno page 564, right column, line 1. The assigned segments will be represented as locations in the segmentation vector space: “Figs. 3–5 show three examples of how the same segmentation at the region level can yield different segmentations at the object level” at page 564, right column, line 4. See also “We have tested approximately 20 different features, chosen among color components (such as RGB, YUV, LSH, normalized RGB, and others), displacement values (the horizontal and vertical components of the optical flow), position values (the absolute x and y coordinates), and texture information …” at page 565, left column, bottom paragraph);

determining the membership of a segment for each pixel according to a distance measure from the data point representing the pixel to the representation of the segment (discussed in claim 1, for the determination of the membership of a segment).

The Castagno, Park, and Bierling combination does not explicitly teach the toroidal canvas.

Globus, in the field of endeavor of image projection (“projected in a complete circle about the spectator's position onto a drum-type screen” at column 1, line 6), discloses an improved cycloramic projection system “The essentials of the novel optics system are a single light source producing a circular beam of light, a single toroidal convex lens concentric with the optical axis, and a single strip of film curved into a circle

also concentric with the optical axis and which is located within the toroidal lens and surrounds a cone-shaped reflecting surface also concentric with the optical axis that functions to turn the light beam radially outward throughout a complete circle and pass through the film thus to condense the image on the film into a ring of light which is intercepted by the toroidal convex lens resulting in the projection of a focused image completely around the circular screen" at column 1, line 42.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to be motivated to include the segmentation system of the Castagno, Park, and Bierling combination with pixels in a toroidal canvas as taught by Globus, such that a " non-distorted, and reliable image to be produced in a completely circular mode" at column 1, line 41.

Response to Arguments

a) Summary of Applicant's Remark:

The previous specification and claim objections should be withdrawn in view of the amendment.

Examiner's Response:

Examiner agrees, and the previous objections are withdrawn.

b) Summary of Applicant's Remark:

"In the interest of clarity, the term "motion vector" will hereafter be used to mean "motion or displacement vector", and the term "DFD" will be used to mean "displaced frame difference"." at response page 11, line 1.

Examiner's Response:

For the "motion vector" please reference to Bierling figure 2 symbol D. for "DFD" please reference to Bierling "… the remaining frame difference, called displaced frame difference (DFD) …" at column 5, line 64. The statement in response page 11, line 1, gave no further meaning above stated terms. Please further clarify the meaning of A) "motion vector", B) "displacement vector", and C) "displaced frame difference".

c) Summary of Applicant's Remark:

"There is nothing in Bierling or in Castagno or in Park that comes close to suggesting that a DFD might be used as a distance in segmentation vector space in an image segmentation process" at response page 11, line 12.

"Castagno seeks to segment a video sequence into objects and has no interest in reducing the jerkiness of interpolation. If directed more specifically to the disclosure in Bierling of the use of DFD, one skilled in the art reading Castagno (or of the combination of Castagno and Park) would see use of the DFD in an improved algorithm for calculation motion or displacement vectors. Thus, there is no common sense combination of these references" at response page 11, line 19.

Examiner's Response:

As discussed in Castagno , "For each picture element, a vector of features (including motion , texture, color, and texture information) is extracted …" at page 563, right column, line 10, and "[I]n particular, several methods have been proposed that perform spatiotemporal segmentation. Typical schemes consist of obtaining a

segmentation based on spatial (i.e. color/gray level) information and iteratively improving it by means of the motion information, by projecting the segmentation from frame to frame and using motion information for region merging …" at page 565, right column, line 8. Thus, Castagno suggests the concept of spatiotemporal segmentation using motion information. Bierling suggests the "displaced frame difference": "this technique provides uniquely defined displacement vector fields which are valid for the temporal positions of the fields to be interpolated …" at column 3, line 25 Refer to the rejections above.

d) Summary of Applicant's Remark:

"It is important to note that Bierling is always striving to reduce the DFD to zero. A non-zero DFD is in the context of Bierling merely an indication that the correct motion vector has not yet been achieved" at response page 11, line 26.

Examiner's Response:

The zero expectation is expected for unchanged picture areas "zero displacement vectors are assigned to picture elements in unchanged picture areas by means of change detector" at Bierling column 2, line 27.

e) Summary of Applicant's Remark:

" It should be recognized that one skilled in the art who takes Castagno and Park in combination would see no relevance whatsoever in the cycloramic image projection system of Globus, despite its use of a "toroidal" lens, such that such a combination is

against common sense. First, Globus does not disclose a toroidal canvas. Second, the reader of Castagno is not interested in producing an image in a completely circular mode. Furthermore, even if the reader of Castagno were directed to employ the disclosure of Globus, the result would be the use of a toroidal lens in the downstream display of an image which had at some point been segmented into objects as disclosed by Castagno and Park. The notion that the disclosure of a toroidal lens in Globus should render obvious in the combination of Castagno and Park a segmentation vector space in a toroidal canvas, is - respectfully – fanciful" at response page 13, line 20.

Examiner's Response:

In response to applicant's argument about the usage of toroidal lens, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

f) Summary of Applicant's Remark:

"The toroidal canvas is a mathematical construct in segmentation vector space equivalent to stitching the left edge to the right edge and the top edge to the bottom edge. This, as explained at page 8, lines 7-12 of the application as filed, is a solution to the problem of the disappearance or reappearance of objects" at response page 13, line 15.

Examiner's Response:

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., toroidal canvas is equivalent to stitching the left edge to the right edge and the top edge to the bottom edge")are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

10. Applicant's amendment is rejected in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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